

What we claim is:

1. A method for realizing subscriber's roaming service by a route server, employed in a next generation network architecture which realizes cross-domain call route through the route server, comprising the following steps of:

(a) a subscriber equipment accessing to a network, sending a register request, and reporting subscriber identification and authentication information after finding a local register server;

(b) the local register server judging whether the subscriber is a contracted subscriber of home domain or not according to the subscriber identification, if yes, performing step (c), otherwise, performing step (g);

(c) the local register server judging whether the authentication information is right or not, if not, refusing the registration, otherwise, performing the next step;

(d) the local register server notifying a local soft switch control device to perform a register operation;

(e) the local register server judging whether there is roaming register information of the subscriber being existing, if not, registering the subscriber and reporting a location update message to the route server, and ending the registration; otherwise, notifying the register server of roaming region that the subscriber has returned, and reporting the location update message of the subscriber to the route server, then performing the next step;

(f) the register server of roaming region logging the register information of the roaming subscriber, and reporting the location update message of the roaming subscriber to the route server via the soft switch control device, then ending the registration;

(g) the register server of roaming region finding the local register server through the route server, and judging whether the authentication information is right or not in messages exchange between the register server of roaming region and the register server of home region, if not, refusing and ending the registration, otherwise, obtaining service

information of the roaming subscriber, and performing the next step;

(h) the register server of roaming region notifying the soft switch control device to perform register operation, allocate resource for the roaming subscriber, store location information of home region and the service information of the roaming subscriber, and send the register message containing the location information of the roaming region to the local register server;

(i) the local register server notifying the soft switch control device of home region to register the registration, and reporting the location update message of the roaming subscriber to the route server, and notifying the register result to the register server of roaming region;

(j) the register server of roaming region notifying the soft switch control device of roaming region to report the location update message of the roaming subscriber to the route server, and ending the registration; and

(k) for roaming subscriber-related services initiated in the roaming region and non-roaming region, the soft switch control device of roaming region performing call connection and service control according to local service and inter-office service respectively.

2. The method of claim 1, wherein in said step (g), the register server of roaming region first finds the register server of original roaming region through the route server, and obtains the location information of home region stored in it, then finds the local register server; at the same time, in said step (h), the register server of roaming region also notifies the register server of original roaming region, the register server of original roaming region logouts the register information of the roaming subscriber, and reports the location update message of the roaming subscriber to the route server.

3. The method of claim 1 or 2, which further comprises the steps of:

the roaming equipment taking initiative to report to the current register server when it is off-line, or the current soft switch control device detecting whether the roaming

equipment is off-line; and

the register server setting the roaming equipment in off-line state after receiving the off-line notification from the roaming equipment or the soft switch control device.

4. The method of claim 1 or 2, wherein in said step (a), the register server allocates an IP address for the roaming equipment after the roaming equipment connecting the register server.

5. The method of claim 1 or 2, wherein in said step (a), the roaming equipment locates the local register server through a DHCP server location mechanism of DHCP protocol, or the roaming equipment looks up the register server through a way of presetting address.

6. The method of claim 1 or 2, wherein in the step (a), the subscriber identification refers to the telephone number or the uniform resource indicator that can locate the subscriber uniquely; the reported information is carried and reported by the roaming equipment automatically, or is input by the roaming subscriber exchanging with the register server through the roaming equipment.

7. The method of claim 1 or 2, wherein in the step (a), said roaming equipment also reports signaling protocol it supports; and

in said step (c) and (g), the register server further needs to judge whether it supports signaling form of the roaming equipment or not, if not, it refuses the registration.

8. The method of claim 1 or 2, wherein in the step (k), the soft switch control device of roaming region sends charge information of the roaming subscriber to the soft switch control device of home region after finishing the service.

9. A system for realizing the method of claim 1, employed in a next generation network architecture with soft switch as core control equipment, comprising:

two or more soft switch control devices located in different physical positions, for accomplishing call connection and service control;

at least one route server, for connecting the soft switch control devices domain into

one network, and realizing functions of subscriber route check-in, report and inquiry;
a roaming equipment, for a roaming subscriber accessing to network; and
a register server, for using coordinately with the soft switch control device, with all
the equipments connected together by network; wherein

said roaming equipment is used for accessing to the network and registering
with the register server mutually, reporting subscriber identification and
authentication information, and performing an ordinary function of receiving and
answering call;

said register server comprises:

an address allocation unit, for allocating an IP address for the roaming
equipment;

an authentication unit, for authenticating the roaming equipment;

a register communication unit, for sending register message containing
location information of roaming region, service information of roaming
subscriber and register notification of subscriber to other register server, and
receiving the register message, the service information of the roaming
subscriber and the register notification of the subscriber from other register
server;

a register control unit, for judging whether the roaming equipment accessed
is a contracted subscriber of home domain, sending a control instruction to the
authentication unit and register communication unit according to preset
procedure, and notifying the soft switch control device to perform operations of
register, check-in and reporting location update message; and

an information maintenance unit, for maintaining local information of the
roaming equipment, and notifying the soft switch control device to logout
information of corresponding roaming subscriber after receiving the register
notification from other register server;

said soft switch control device comprises:

a register operation unit, for allocating resource for the roaming subscriber according to notification of the register control unit, and as the roaming region storing the service information of the roaming subscriber and the location information of local region;

a check-in operation unit, for checking in the register message information transmitted from the roaming region according to notification of said register control device; and

an update report unit, for reporting the location update message to the route server connected.

10. The system of claim 9, wherein the roaming equipment and the register server support DHCP protocol.

11. The system of claim 9, wherein the register server is either a composing part of the soft switch control device, or an independent equipment, or part of functions are accomplished by the independent equipment, and the other part of functions are accomplished by the soft switch control device itself.

12. The system of claim 9, wherein the roaming equipment itself carries the subscriber identification (telephone number or uniform resource indicator), the authentication information and protocol information it supports; said register control unit also judges whether it supports the signaling form of the roaming equipment.

13. The system of claim 9, wherein the soft switch control device further comprises a charge process unit, for sending charge information of the roaming subscriber to the soft switch control device of home region after finishing the service.

14. The system of claim 9, wherein the soft switch control device further comprises an off-line detection unit, for automatically detecting whether the roaming equipment is off-line, and notifying the information maintenance unit to set the roaming equipment in off-line state when the roaming equipment is detected to be off-line.

15. The system of claim 9, wherein the roaming equipment can also take initiative to report the message of oncoming off-line state to the current register server.